

## **Transdiaphragmatic approach to attenuate congenital extra-hepatic portosystemic shunts, inserting in the thoracic part of the azygos vein**

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**Objective:** To describe the surgical technique and to document the feasibility of a transdiaphragmatic approach to attenuate congenital extra-hepatic portosystemic shunts, inserting in the thoracic part of the azygos vein.

**Study design:** Cadaveric study and prospective case series.

**Animals:** Canine cadavers (n=5) and dogs with congenital porto-azygos shunts that inserted in the thoracic part of the azygos vein (n=6).

**Methods:** A transdiaphragmatic approach for attenuation of intra-thoracic portosystemic shunts was fine-tuned in cadavers and subsequently applied in clinical cases. In the cadavers, the azygos vein was filled by retrograde injection of aqueous latex. Landmarks were established for creating a safe corridor for a transdiaphragmatic approach to the shunt insertion site. The clinical cases were suspected to have a porto-azygos rather than a porto-caval communication based on the results of the transsplenic portal scintigraphy. The intra-thoracic insertion of the porto-azygos shunt was confirmed at the time of surgery in all dogs. All shunts were attenuated close to their insertion site.

**Results:** The position of the intra-thoracic part of the aorta was identified by digital palpation through the diaphragm. A small cut was made in the left diaphragm 0.5–1 cm ventral to the level of the aorta; the incision was lengthened bluntly over 3–5 cm. Stay sutures were placed to open up the incision, and a small retractor was used to lift the esophagus away from the aorta. The vagus nerve, the phrenic nerve and the sympathetic trunk were not in the surgical site and were not at risk of iatrogenic damage. A moistened abdominal sponge covered the parietal aspect of the liver and the remaining abdominal content during intra-thoracic dissection of the shunt. Exposure of the shunt insertion site to the azygos vein was excellent in all clinical cases. No technical issues were encountered to place an ameroid constrictor (n=2) or a cellophane band (n=4). There were no intra- or postoperative complications.

**Discussion and conclusions:** Surgical recommendation for congenital portosystemic shunt attenuation is approaching the shunt as close to its insertion site as possible. If a thoracic insertion of a porto-azygos shunt has been identified, a transdiaphragmatic approach exposes the most ideal site for shunt attenuation. This approach represents a relatively easy and fast surgical procedure, without unnecessary abdominal organ manipulation, while the risk of missing additional contributing branches is eliminated.